

AN EXPERIMENT ON COLONIZATION OF KARAKURT
(*LATRODECTUS TREDECIMGUTTATUS*, BLACK WIDOW SPIDER)
ON ISLAND TERRITORIES IN KAZAKHSTAN

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To create an artificial, controllable population of *Latrodectus tredecimguttatus* (karakurt) with the aim of collecting venom, an experiment on mass colonisation of southern population spiders on an island territory was carried out. Retardation of the overwintering stage under laboratory conditions ensured the availability of large numbers of karakurt for colonisation and eliminated its uncontrollable reproduction in neighbouring territories.

Pour créer une population artificielle bien contrôlée des *Latrodectus tredecimguttatus* (karakurt) dans le but d'obtenir du venin on a mis une expérience de la dissémination des Araignées de la population méridionale sur le territoire insulaires. Le délai du stade hivernant dans les conditions de laboratoire assure la stabilisation du nombre de masse de karakurt pour leur colonisation et élimine leur reproduction non-contrôlée sur les territoires adjacents.
□ Colonisation, karakurt, egg sacs, *Latrodectus*.

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In Kazakhstan, mass annual collections of venom-producing arachnids are carried out to obtain their venom for medicinal and other purposes. Black widow spiders ('karakurt', *Latrodectus tredecimguttatus* (Rossi)) are caught in the greatest numbers. At the same time, their abundance varies from year to year: quite often periods occur during which one can hardly find a single specimen (see Marikovskij, 1956; Levi, 1983; Tarabaev, 1990). A bite from a karakurt is an appreciable danger. Hence, during periods of great abundance, it must be controlled. In connection with this problem, we carried out an experiment on karakurt colonisation on an island with the aim of creating an abundant and controllable artificial population.

MATERIALS AND METHODS

The experiment was performed on the small island 'Malyj' (1.4km²) in Alakol' Lake (46°08'N, 81°52'E) near the northern border of the known karakurt distribution: the 2nd instar spiderlings emerging from egg sacs are often affected here by the late frosts which occur in April-May (Tarabaev, 1990). In contrast, the development of spiders is critically restricted by the shortened warm season: if the postembryos within the egg sacs have no time to develop into the overwintering 1st instar spiderlings, they die during winter (Marikovskij, 1956). This phenomenon stipulated the possibility of creating

a numerous, yet controllable karakurt population. To do so we retarded the development of spiderlings and then released the 2nd instars over the island. As a result, the spiderlings avoid the disastrous late frosts but the postembryos of the new generation in their egg sacs would not have time to develop into overwintering 1st instar spiderlings. This phenomenon is therefore the necessary condition for the possibility of creating a controllable karakurt population, as well as for elimination of uncontrollable mass reproduction of spiders on the neighbouring territories. For the intensification of degree-days deficit effect, the spiderlings from 500 egg sacs of *Latrodectus tredecimguttatus* collected in Uzbekistan (southern population from Dzhizak Steppe) were used in our experiment. Before the colonisation we made a census of the native population of karakurt on the island.

During winter, egg sacs of southern population spiders with overwintering first instar spiderlings were kept in the laboratory (temperature 0-5°C). In the second half of May these were placed into a gauze-covered 20 litre vessel at room temperature (18-22°C), for their reactivation from winter diapause. After moulting in their egg sacs, many spiderlings emerged; then the vessel which contained them was placed in a refrigerator (4-5°C) until June.

Before mass colonisation, a census of the natural karakurt population on 'Malyj' Island was carried out by the visual investigation of the

whole island territory fit for the settling by the southern population spiders of karakurt (ca. 8500 m²).

RESULTS

While making a census of the native karakurt population on 'Malyj' Island before mass colonisation on 12 June 1988, we found one nest from the previous year with two empty egg sacs, and two more old nests. Six living karakurt specimens of 4-5th instar were also found. By late August there were 3726 nests from the southern population, or one specimen per 2-3m². Three females of the native karakurt population were also found: they differed by their larger size (no females were measured). In 28 nests of southern population spiders there was only one egg sac per nest: no egg sacs were found in the rest, while in three nests of native population spiders there were two egg sacs in each. Dissection of egg sacs confirmed our views. In four egg sacs of the native karakurt population there were postembryos, in two there were first instar spiderlings, while only eggs were found in 20 egg sacs of the southern population.

Of 100 nests examined in May 1989, 74 nests were without egg sacs—some nests were ruined; 26 nests each had one egg sac, all eggs were dead. These results confirmed that due to the artificially retarded development of southern population spiders in the northern conditions of Alakol' Lake the eggs had died within the egg sacs as they had insufficient time to develop to the overwintering first instar spiderlings (the average Alakol' area temperature in September is no more than 10-15°C).

We therefore propose the following scheme for the creation of many controllable artificial black widow populations for the purpose of obtaining venom.

In August-September, mass collection of females must be carried out. These females are kept in collection boxes for 2-3 weeks until they lay their egg sacs in these boxes. (This phenomenon was first noticed by us when studying the technique of mass collecting from the field). Females are subsequently used for obtaining venom while egg sacs are kept at room temperature until the 1st instar spiderlings emerge (overwintering stage). After that the egg sacs must be kept in a refrigerator at 0-5°C until the following season.

After the reactivation of spiderlings in spring, they are released over the island, which they recolonised effectively. Every August-September, mass collection of females is carried out, and the cycle is renewed.

Thus, the indubitable advantage of our method is the elimination of uncontrollable mass reproduction of karakurt and the absence of any necessity of special egg sacs collecting for colonisation.

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